

REMARKS

Claims 1-2 and 5-22 are pending in this application. Claim 1 is the only independent claim.

Applicants acknowledge with thanks the indication in the Office Action that claims 21-22 are allowed, and that claims 5-8, 14, and 16-18 are also considered allowable except that they depend on rejected claims.

I. **Objection to the declaration**

In the Office Action, the declaration is objected to. It is alleged in the Office Action that the inventor's citizenship is improperly indicated (i.e., that "French" should be "France").

The objection is again respectfully traversed. However, in order to advance prosecution of this application, it is intended that Applicant will submit a substitute declaration, in which the inventor's citizenship will be indicated as "FRANCE".

It is submitted that, upon receipt of the substitute declaration, the objection should be withdrawn.

II. **Art rejections**

In the Office Action, claims 1-2, 9-13, 15, and 19-20 are rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over, US4572114 to Sickler et al. ("Sickler").

The rejection is again respectfully traversed. Applicants urge reconsideration of the interpretation of Sickler set forth in the Office Action. Namely, Sickler describes an engine operating mode in which injection is totally or nearly totally shut off and the engine is used as an

air compressor, so that the person of ordinary skill in the art would immediately understand that there is no combustion. Accordingly, Sickler fails to teach or suggest the method of the present invention which includes “a combustion phase for the air/fuel mixture contained in the chamber,” as recited in present claim 1.

Namely, Sickler describes an internal combustion engine that is used as an air compressor in a particular “two-stroke compressor” operating phase. The objective of this phase is to produce a powerful engine brake that is useful to complement the braking circuit on the wheels of the vehicle. Such technology is used more particularly on truck engines, since they have high braking requirements. Of course, in such phases, the objective is to consume energy to slow down the vehicle, and not to produce energy.

Generally, in a combustion engine, energy is consumed mainly during compression. Thus, in a 4-stroke engine, in which an engine cycle is performed over two crankshaft revolutions (combustion-release / exhaust / intake / compression), combustion occurs once in normal operation. The objective of Sickler is to provide two compression phases instead of one (see Sickler abstract: “The process provides a compression release event for each cylinder during each revolution of the engine crankshaft”; see also Sickler at col. 2, lines 6-10). To this aim, the usual “combustion-release” phase is transformed into a first “admission” phase with opened intake and exhaust valves, and the usual “exhaust” phase is transformed into a first “compression” phase, with closed valves. The usual “intake” phase becomes a “second intake” phase and the usual “compression” phase becomes a second “compression” phase.

Of course, such operating mode is completely contradictory with ignition of an air-fuel

mixture, because this would result in energy production rather than consumption. For example, the mechanism of Sickler provides a “forced intake” phase instead of the usual “compression-release” phase (see Sickler at col. 4, lines 30-32 and 55-57).

In addition, if combustion were taking place, burned gases would be rejected into the intake circuit during one of the intake phases and would ignite the air filter, the engine, and thus the vehicle. This is why “the fuel supply is shut off or reduced so that little or no fuel is injected into the engine cylinder” (Sickler at col. 4, lines 16-17). There is no ambiguity in Sickler as to the fact that there is no “powering” by the engine during the “double compression” mode (see Sickler at col. 2, lines 46: “In effect, applicant has converted an engine having a four-stroke cycle during the powering mode of operation into a compressor having a two-stroke cycle during the retarding mode of operation”).

Further, it is submitted that the statement of Sickler that “the engine continues to operate in the standard four-stroke cycle mode so as to produce one compression release event per cylinder for every two crankshaft revolutions” (Sickler at col. 2, lines 23-27) does not suggest that there is a combustion phase “in order to continuously support a proper engine operation,” as alleged in the Office Action (paragraph bridging pages 4-5).

As a preliminary, it is noted that this passage of Sickler is part of the introduction that describes the prior art and not the system of Sickler, which is precisely to use a double compression instead of a sequence compression-combustion.

Next, it is noted that, even though the prior art described in Sickler operates with a single compression phase in compressor mode, there is no combustion phase. For example, the base

patent US 3,220,392 to Cummins mentioned at col. 1, line 32 of Sickler describes the transformation of an engine into an air compressor to slow down a vehicle and thus supplement the brakes with which the wheels are equipped (in particular, for large vehicles such as trucks or tractor-trailers, these brakes can be insufficient, for example, on steep slopes). It is observed that the exhaust valves are open at the end of the compression phase so that the work performed by the compression is not compensated by a power phase but is followed by the additional work of evacuating the compressed gases via the exhaust line (see Cummins at col. 1, lines 33-40). If the compressed gases are evacuated, there is no fuel-air mixture to be combusted in the chamber during the next phase. Accordingly, the statement at col. 2, lines 23-27 of Sickler only means that, in the prior art, the compressor mode of the engine has four strokes like the powering mode of operation, in contrast to the system of Sickler which is a two-stroke compressor.

Clearly, there is no combustion and no power phase for a cylinder that operates as an air compressor, whether in the prior art mentioned in Sickler or in the double-compression system of Sickler. This would be contradictory to the intended purpose, since an air compressor is aimed at slowing down the engine, or, in other words, at withdrawing energy from the engine shaft, and absolutely not to produce energy. Sickler does not provide any suggestion of a combustion, and a person of the art would immediately understand from Sickler that combustion is contradictory to a compressor mode.

In summary, the double compression operating mode of the engine of Sickler is intended to be used as air compressor in order to generate a powerful “engine brake,” which is useful to contribute to supplement the braking circuits of the vehicle wheels so as to reduce the speed of the

vehicle. The objective of such operating phase is to consume energy, not to produce it, so that the person of the art would understand without any ambiguity that a combustion phase is excluded because it would negate the objective of Sickler and possibly destroy the engine. As a result, the double-compression operating mode of the engine of Sickler is very remote from the present invention, which is provided in the context of a powering operating cycle of an engine with a combustion phase, as recited in present claim 1, whereas Sickler does not provide any guidance or incentive regarding a powering cycle.

Further, in the presently claimed invention, valve timing and injection and combustion phase are timed with a view at making it possible to reduce or avoid a knocking phenomenon, and in particular, the exhaust closing time (FE) is between the first intake opening time (OA1) and the second intake opening time (OA2), and the first intake closing time (FA1) precedes the second intake opening time (OA2), as recited in present claim 1. The features of the presently claimed invention and its advantages are not taught or suggested in Sickler. Therefore, the present claims are not obvious over Sickler.

In addition, with respect to the dependent claims, it is submitted that the cited references fail to teach or suggest the combined features of each of these claims. Therefore, each of these respective claims is not obvious over Sickler.

In view of the above, it is submitted that the rejections should be withdrawn.

In conclusion, the invention as presently claimed is patentable. It is believed that the claims are in allowable condition and a notice to that effect is earnestly requested.

Request for reconsideration
U.S. Appl. No.: **10/562,417**
Attorney Docket No. **PSA0307692**

In the event there is, in the Examiner's opinion, any outstanding issue and such issue may be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants hereby petition for an appropriate extension of the response period. Please charge the fee for such extension and any other fees which may be required to our Deposit Account No. 502759.

Respectfully submitted,

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